

THE CHARACTER OF THE EVENING.

The following remarks by Mr. Lee A. Denison, observer, Weather Bureau, at Albany, in a letter dated September 27, 1897, are commended to the attention of all observers:

I have the honor to suggest that where two or more observers are serving on station the "Character of the evening," as in the case of the "Character of the day," be entered in the Daily Journal.

By the "Character of the evening" I refer especially to the general effect of the state of the weather, combined with starlight or moonlight, or both, upon the darkness and therefore on the sight of the traveler, pedestrian, and others, exposed at this period of the twenty-four hours. The length of time included in the term "evening" is from the end of twilight to midnight.

It can not be denied that a large percentage of accidents occur during the evening and a careful observation of the "Character of the evening" will be of great value when the records of the Bureau are produced before the several courts of the country.

It occurs to me that a scale, as in the case of cloudiness—0 to 10—somewhat similar to the following, might answer the purpose in describing and estimating the conditions as to darkness:

Clear with half to full moon	0
Clear with new to half moon	1
Partly cloudy with half to full moon	2
Partly cloudy with new to half moon	3
Cloudy, upper clouds, with half to full moon	4
Cloudy, upper clouds, with new to half moon	5
Clear with starlight	6
Partly cloudy with starlight	7
Cloudy, upper clouds, with starlight	8
Cloudy with starlight	9
Cloudy, rain, or fog, with starlight	10

It has been found impracticable to enforce the above suggestion upon all Weather Bureau stations, but it is so excellent that the Editor commends it for consideration by all.

CLIMATE OF LIBERIA.

Ever since 1871 the Weather Bureau has endeavored to collect data bearing upon the origin of our West Indian hurricanes, some of which have been traced backward to points near the African coast, so that it seems likely that these originated in that region. Instruction has been given and apparatus furnished to observers who contemplated living in Liberia in order to obtain and enter data upon the daily weather map of the Northern Hemisphere, but direct returns have been rare. Lately we have received from Prof. O. F. Cook a short climatological table, which adds considerably to the data in hand. Mr. Cook and his colleague, Mr. Collins, representing the University of Syracuse, N. Y., have spent a number of seasons in Liberia in the study of natural history. On the second expedition they landed in Monrovia, January 3, 1894, and left July 22. Their stay was divided between Monrovia and the experimental farm at Mount Coffee, whose summit is 320 feet above sea level. The following observations of temperature were apparently made on Mount Coffee, but as the whole region for twenty miles inland does not ascend to a greater height than 300 feet above the ocean it is probable that these fairly represent the climate of the lowlands near the coast. The tide in the St. Pauls River is appreciable up to the rapids near Muhlenberg Mission, 20 miles from its mouth. A permanent station was built by Messrs. Cook and Collins for their scientific work on Mount Coffee, 10 miles from the boat landing at White Plains and 140 feet above the level of St. Pauls River at that place. The following thermometric record is copied from pages 27-30 of the "Second Report of Prof. O. F. Cook to the Board of Managers of the New York State Colonization Society, October, 1894. John Bingham, Printer. New York City:"

Mr. Collins kept, when convenient, a record of the readings of the thermometer and hygrometer, from which the following table was made. It will be seen that the temperature, while never excessive, is constantly high. The season was generally considered to be a hot one, and the records cover the hot months of the year. The readings were taken in shaded, well ventilated locations, care being taken, however,

to protect the hygrometer from currents of air. The hygrometer columns give the difference in degrees between the wet and dry bulbs of a tested instrument.

The lowest temperature noted was 62°, registered at 7 a. m., January 20. The next day at the same hour the temperature was 68°. An attempt was made to get the temperature in the sun, but our thermometer registers only 115°.

Hour of reading.	Thermometer.				Hygrometer.				Rainfall, number of—	
	No. of readings.	Maximum.	Minimum.	Mean.	No. of readings.	Maximum.	Minimum.	Average.	Days.	Hours.
Jan., 9 a. m.	21	79	72	76.9	21	5	1	2	5	5
12-2 p. m.	23	85.5	79	82.6	23	10	2.5	4.7		
4-6 p. m.	22	82.5	73.5	80.7	22	5.6	2	3.6		
Feb., 9 a. m.	15	83	74	78.5	15	6	1	3.1	1	4
1-2 p. m.	15	86.5	78	83.9	15	10	1	6		
5-6 p. m.	14	83	77	81.2	14	5.5	2	3.1		
Mar., 9 a. m.	20	82.5	73	78	20	8	1	2.8	7	6
1-2 p. m.	12	89	80	86.7	12	6	5	5.3		
5-6 p. m.	11	83.5	79	81.4	11	4.5	2	3		
Apr., 9 a. m.	11	87	75.5	83.1	11	6	1	4	17	41½
1-2 p. m.	8	92	83	88.7	8	10	2	4.3		
5-6 p. m.	6	84	74	78.6	6	4	1	2.3		
May, 9 a. m.	9	84	72	79.2	7	5	5	2.8	16	35½
12-1 p. m.	13	93	74	83.5	12	6	1	3.6		
June, 9 a. m.	11	83	76	79.6	11	3	1	2.1		
12-2 p. m.	13	87	74.5	82.2	12	7	1	3.7	23	106½
5-6 p. m.	4	78	74	75.5	3	5	1	2.7		

THE RAINFALL AND OUTFLOW OF THE GREAT LAKES.

On pages 164-166 of the MONTHLY WEATHER REVIEW for April, 1898, the Editor has computed, for each of the Great Lakes, respectively, the available surplus of water, viz, the inflow from the upper lake, the direct rainfall plus the run off from the surrounding watershed less the annual evaporation, and has shown that the computed surplus decidedly exceeds the measured outflow. The excess is so large that it argues a corresponding uncertainty in all the data entering into the computation and fully confirms the conclusion expressed in the first report of the United States Deep Waterways Commission, viz, that every effort must be made to obtain better and more reliable data. To this end, in fact, the present United States Board of Engineers on Deep Waterways has been organized, and the following extracts from letters of G. Y. Wisner, C. E., a member of this Board, show the present condition of our knowledge of the subject:

Lake Erie.—The discharge into Niagara River for mean lake level will probably prove to be about 235,000 or 240,000 cubic feet per second (instead of 250,000, adopted on page 164).

Lake Superior.—The outflow, namely, the discharge through St. Marys River, was determined in 1895, by Mr. Haskell, as 72,600 cubic feet per second for mean lake level, instead of the 86,000 formerly adopted.

Lake Michigan plus Huron.—The discharge of the St. Clair River will probably be diminished proportionately, viz, about 10 or 12 per cent, reducing it from 225,000 to 200,000.

Lake St. Clair.—The discharge of Lake St. Clair, through Detroit River, will fall below 200,000 cubic feet per second for mean condition.

As regards the run off for Lake Superior, a fair estimate for the watershed is 40 per cent, as the country surrounding the lake is very rolling and rocky. For lakes Michigan, Huron, and Erie, 33 per cent is about right.

Adopting these values we have the following results:

Lake Superior.—Total supply 4.2 feet, total discharge 2.6 feet, leaving 1.6 foot for evaporation and errors in the estimates.

Lake Huron plus Lake Michigan.—Total supply 6.6 feet, total discharge 5.0 feet, leaving 1.6 foot for evaporation and errors in the estimates.

Lake St. Clair plus Lake Erie.—Total supply 27.8 feet, total discharge 25.5 feet (adopting 235,000 feet per second), leaving 2.3 feet for evaporation and errors in the estimates. Discharge for Lake Huron is probably less than 200,000, which would increase this excess by 20 per cent above the estimate for Lake Huron and decrease that for Lake Erie.

Nothing more definite can be hoped for until the final report of the engineers who are now at work on the physics of the lakes and waterways.

Evaporation is the most uncertain element in the solution of this problem, due to the fact that evaporation, as determined at observation